SmartPort Ploce –
Enchancing public services through a private 5G network

SmartPortPloče project - Overview

Project Target:

Automation of port authority Ploče industrial processes & logistic capabilities with the aid of new future proof technologies

Project consortium:

- Port Authority Ploce
- Markoja d.o.o.

Project data:

- Duration 30 months (06.2026)
- Deployment of three use case:
  1. Introducing Real-Time Location System (RTLS)
  2. Surveillance and record keeping of cargo manipulation
  3. Incident prevention and management
- CEF Contribution 958.125,00 EUR

Overview Project Consortium members

- Public institution, directly responsible to the Ministry of the Sea, Transport and Infrastructure of Republic of Croatia

- Responsible for governance, development and utilization of port of Ploce

- The Port Authority's main activities are:
  - caring for the construction, maintenance, management, protection and improvement of the port
  - ensuring permanent and uninterrupted port traffic, technical and technological unity and safe navigation
  - coordinating and supervising concessionaires performing economic activities in the port area
  - managing the free port zone.
- Main concessionairs: Port of Ploce Inc., Adriatic Tank Terminals, Top Logistics, Port of Ploce Constructions, Passenger Terminals, Police, Fire fighters etc.

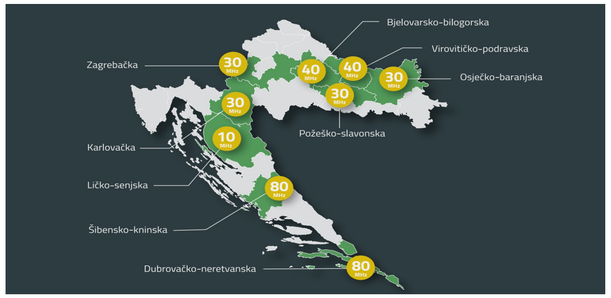
Creating adequate working conditions to all its concessionaires and stakeholders along with coordination of all processes and maintenance within the port area is **main obligation and purpose** of Port of Ploce Authority.

- Private owned company operating in Telecom sector in Croatia since 1994

- Three main business units

- Professional services for TelCo
- Automation and sensorics
- 5G private networks & mobile Telco infrastructure deployment

Owner of concession for 5G spectrum in nine counties in Croatia (avg 30% population and 50% territory coverage)

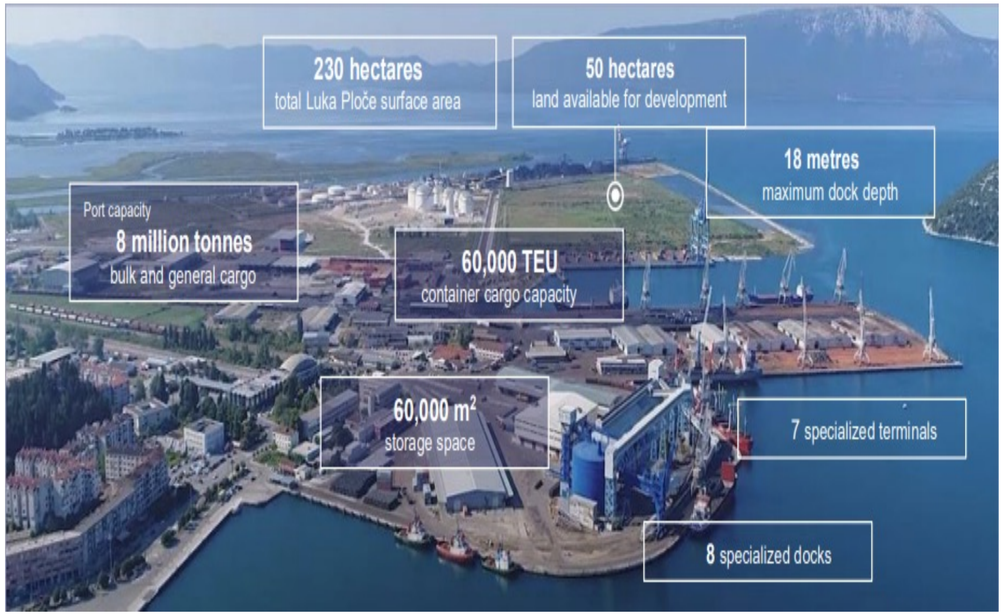


Innovation, development and implementation of effective solutions and **act as initiator of positive changes** in the era of the information technology revolution

Area and main facts overview

Port of Ploče position in corridor Vc

- Port of outstanding national economic interest for the Republic of Croatia
- Situated in the south east part of Croatia in Dubrovacko – Neretvanska County
- Located on the eastern coast of the Adriatic Sea along the European route E-65
- Strategic position along the 5C branch of the Fifth-Pan-European Corridor



Project justification

- Port of Ploce as governed by Port Authority is a complex and interdependent system
- Large number of entities that operate within the port area
- Numerous operations that are directly or indirectly bonded to port activities and operations

Many shortcomings and bottlnecks in the operational process

Inadequate traffic coordination

- Current situation and technology do not allow to properly track the overall traffic

Insufficient IT and Telco Infrastructure – integration of operation of all entities operating in the area impossible with current systems

Port operations organized in a reactive way

- i.e. cargo loading and unloading tracking done manually and no dedicated digital IT systems

Port security insufficient

– Insufficient surveillance systems implemented and lack of technology that allows implementation of advanced systems

Environmental and pollution issues

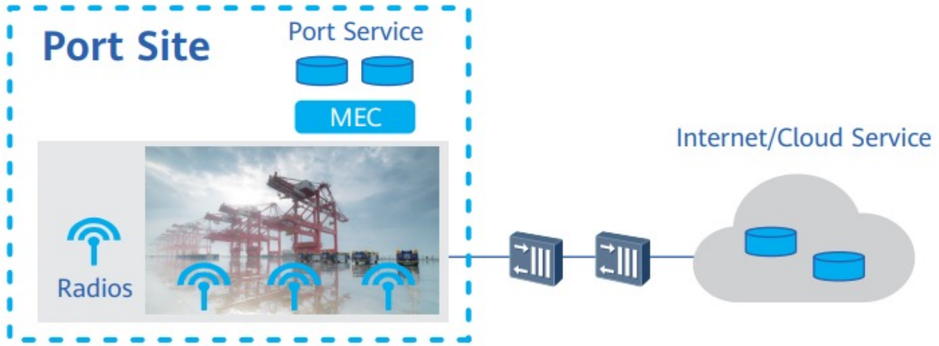
– no means and resources to measure and track the air and sea quality

Most of the operational processes are handled in a reactive way due to the lack of proficient IT systems and adequate TelCo infrastructure

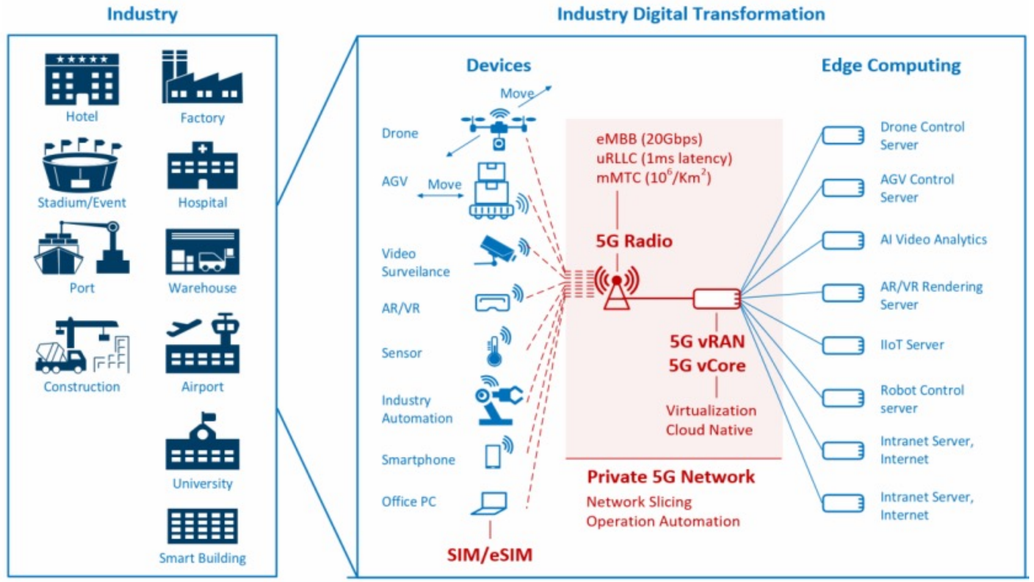
Towards a Smart Port

- Smart ports can be considered ports which autonomously conduct port operations and optimize the logistics chain by applying new and advanced technologies

Features of the smart port:
- management of technological processes
- digitization
- increasing the efficiency of port activities
- integration of the port with the city
- use of renewable energy sources



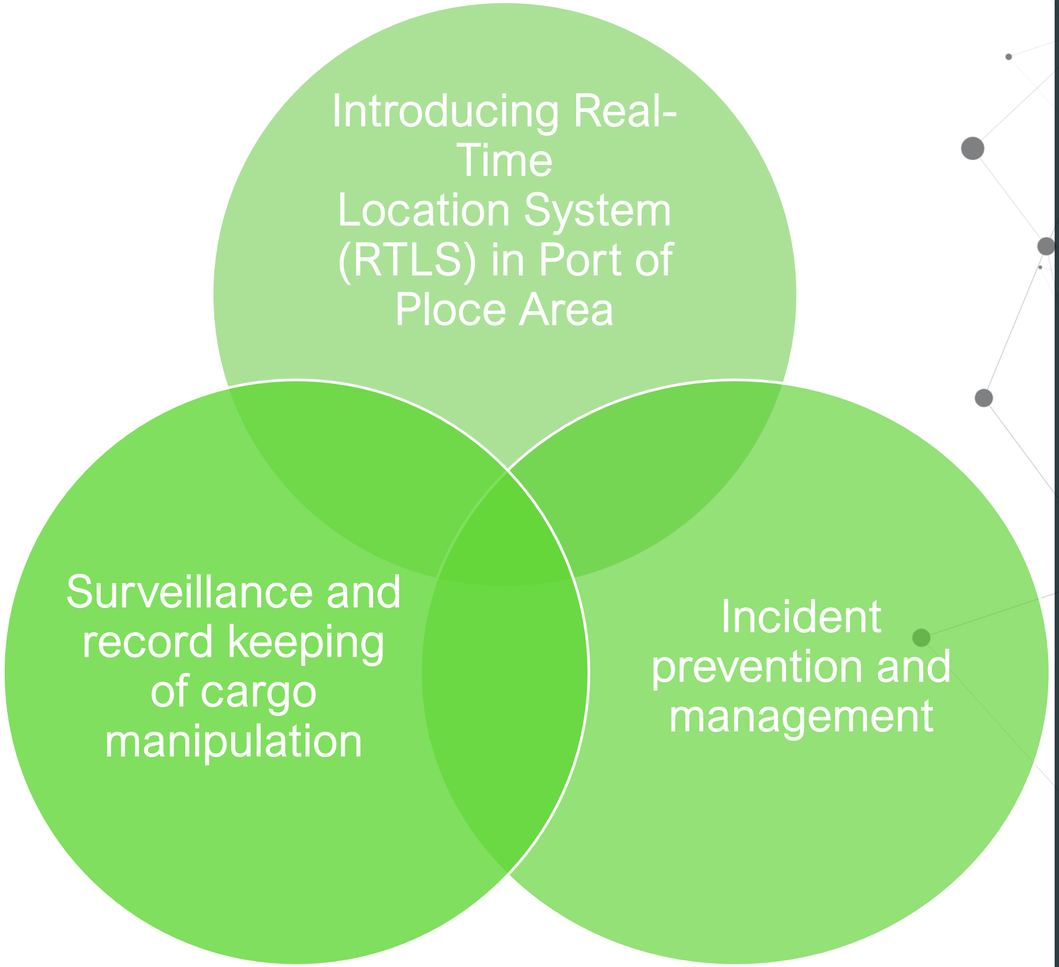
- 5G: The only communication standard that long-term meets all the needs of the port and can replace and integrate other current communication technologies



Why 5G?
- ✓ Unique network - easy upgrade and long-term
- ✓ 5G + MEC >> low end-to-end latency
- ✓ Network Functions Virtualization (NFV)
- ✓ Network slicing
- ✓ High data transfer speeds
- ✓ Data security
- ✓ Connecting different sensor technologies
- ✓ Link to other technologies

Use case deplyoment under CEF programme

- Deployment of 5G infrastructure and Mobile Edge Computing (MEC)
- Deplyoment of three use cases that will enchanece part of the operational processes in the area under the Governance of the Port Authority
- Three use cases have been identified as capable to solve the most impellent issues in the operational processes



Case 1: Real-Time Location System (RTLS) in Port of Ploce Area

Two main segments to be deployed under this case

Precise and efficient tracking of vehicle traffic
- tracking whether the specific vehicle is on the designated spot
- Preventing vehicles to end up at the wrong terminal or at a wrong place
- Automatization empowered by smart signalization
- increase the level of security within the port

Deployment of system at the seaside of the port
- geolocating ship position at berthing or at anchorage
- information of weather, wave range, tides
- provide assistance and advice for berthing, loading/unloading

Key Enabler: bring computation and services to the edge of the network to ensure low latency and faster responses because of localized computation and decision-making

Case 2: Surveillance and record keeping of cargo manipulation

- deployment of sensors and smart cameras that allow video analytics
- more efficient and more accurate daily operations
- accurate record and data keeping
- ensure that each cargo is stored at proper intended place
- prevent unwanted mixing of different types of cargo and prevent incidents
- drone with sensor and camera → recognize and keep record of bulk cargo and measure its quantity
- precise record keeping of cargo in terms of cargo type and quantity
- recognize damages on containers or other freights
- count entrance and exits of cargo objects in and out of storages

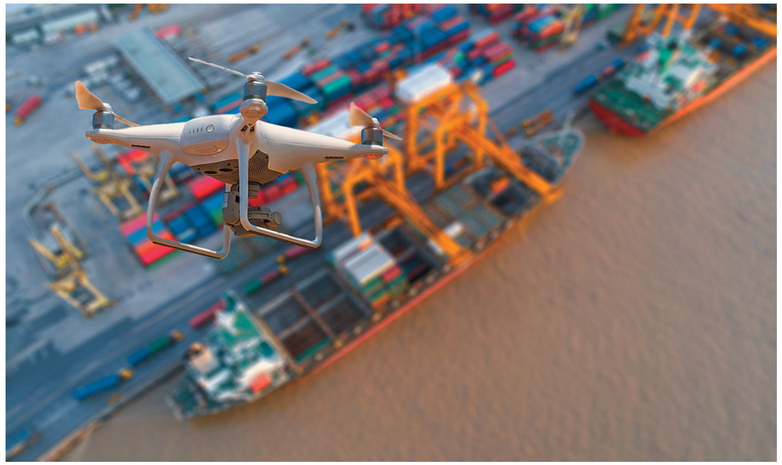
Acquired data that will be sent to central platform operator via 5G network which will allow much more precise record keeping of cargo in terms of cargo type and quantity.
To enchance efficiency data processing needs to be **processed at the edge**

Case 3: Incident prevention and management

- Installation of fire detection sensors and termovision cameras → quicker and location accurate response in the event of fire
- drone equipped with a camera → identify the fire as it may arise, location of sea pollution
- installation of local weather station for measuring wind and humidity → Allow prompt reactionon pollution due to bulk cargo by triggering prompt spraying of coal and bulk cargo

All data acquired by this system of sensors and cameras could easily, promptly and in their full range need to be shared with other public service providers (fire department, police, custom office, ambulance etc) as **key stakeholders**

- ✓ Data intensive use cases
- ✓ Many stakeholders in the Area involved
- ✓ Reliability must be at the highest level
- ✓ Prompt data processing and dana sharing must be ensured



Conclusions

Specific objectives of the project

1. Enable leading edge connectivity in the area under governance of the Port of Ploce Authority
2. Improve public service of Port of Ploce Authority
3. Optimise work processes and level of security within Port Authority
4. Enable large data share and analytics with other key public service providers

Main expected outcomes and results

1. 5G and MEC network deployed and set-up in the Port of Ploce Authority area
2. Three (3) innovative use cases, based on large data collection and transfer implemented

Main result: improvement of overall services provided by Port of Ploce Authority

Hvala!

MARKOJA production, trade and services Ltd.
Selska cesta 93, Zagreb

T +385 1 365 1340
E info@markoja.hr
W markoja.hr